REMARKS

This application has been reviewed in light of the Office Action dated May 11, 2007. In view of the foregoing amendments and the following remarks, favorable reconsideration and withdrawal of the rejections set forth in the Office Action are respectfully requested.

Claims 2-8 are pending. Claim 2 has been amended. Claim 8 has been added. Support for the new claim and claim changes can be found in the original disclosure, and therefore no new matter has been added. Claims 2 and 8 are in independent form.

Claims 2-7 were rejected under 35 U.S.C. § 112, first paragraph, as not supported by the specification, as filed. Without conceding the propriety of this rejection, Claim 2 has been amended. Withdrawal of this rejection is respectfully requested.

Claims 2-6 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,126,271 (*Terui*) in view of U.S. Patent No. 6,245,245 (*Sato*).

Claim 7 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Terui* in view of *Sato*, and further in view of the article "Abrasive Wear Performance of Various Poly Amides" (*Rajesh et al.*).

Applicants respectfully traverse the rejections over the prior art. Applicants submit that the independent claims are allowable over the cited art, for at least the reasons set forth below.

Independent Claim 2 is directed to a method of manufacturing a substrate for an ink jet recording head. The substrate has a supply port, penetrating the substrate, for supplying liquid and an energy generating element for generating energy for ejecting the liquid. The method includes a step of forming a protecting film on a surface of the substrate which is

opposite from a surface on which the energy generating element is disposed, a step of etching a surface of the protecting film by liquid containing ammonium fluoride to make the protecting film a thin film having a thickness of not more than 500 nm, a step of forming an etching-resistant film on the thus etched protecting film, a step of forming opening patterns in the protecting film and the etching-resistant film, a step of forming an opening as the supply port, in a side of the substrate opposite from a side thereof having the energy generating element, by etching the substrate through the opening patterns, a step of removing a projected end portion of the protecting film which is projected into the opening and which is produced in the opening forming step, and a step of removing the etching-resistant film after the projected end portion removing step.

Independent Claim 8 is directed to a method of manufacturing a substrate for an ink jet recording head. The substrate has a supply port, penetrating the substrate, for supplying liquid and an energy generating element for generating energy for ejecting the liquid. The method includes a step of forming a protecting film on a surface of the substrate which is opposite from a surface on which the energy generating element is disposed, a step of etching a surface of the protecting film by liquid containing ammonium fluoride to make the protecting film a thin film, a step of forming an etching-resistant film on the thus etched protecting film, a step of forming opening patterns in the protecting film and the etching-resistant film, a step of forming, by etching the substrate through the opening pattern, an opening as the supply port in the substrate and a projection comprising the protecting film and the etching-resistant film in the opening, a step of removing an end of the protecting film while leaving an end of the etching-resistant film, in the projection projecting into the opening and having been formed in a surface opposite from a side

having the energy generating element when the opening is formed, and a step of removing the etching-resistant film after the projected end portion removing step.

Claim 8 includes subject matter similar although not identical to that of Claim 2. Applicants present below three arguments in favor of the patentability of Claim 2 over the cited art. The second and third of those arguments apply also to Claim 8, in view of the similarity of subject matter between Claims 2 and 8. Regarding the first argument presented below, it is noted that the etching step (second listed step) of Claim 8 recites "to make said protecting film a thin film" but not "having a thickness of not more than 500 nm."

(An extensive explanation of Claim 2 and the cited art was given in the Amendment After Final Rejection filed on February 16, 2007. The Examiner is referred thereto for background information.)

1. Regarding the etching step (second listed step) of Claim 2, the Office Action (page 3) cites *Terui* (col. 2, lines 1-2) as teaching "a step of etching a surface of said protecting film" and (page 4) *Sato* (col. 5, lines 11-16) as teaching "the use [of] ammonium fluoride in addition to HF for removing silicon oxide layer." However, the Office Action is nowhere seen to address the recitation "to make said protecting film a thin film having a thickness of not more than 500 nm," which is part of the etching step. Since the Office Action is understood neither to have considered all of the words of Claim 2 in considering its patentability against the prior art, nor to have alleged that all of the limitations of Claim 2 are taught or suggested by the prior art, it is submitted that the basic requirements of a *prima facie* case of obviousness have not been satisfied and *prima facie* obviousness has not been established with respect to Claim 2. M.P.E.P. 2143, 2143.03.

2. Regarding the projected end portion removing step (second to last listed step) of Claim 2, the Office Action (page 4) cites *Terui* (Fig. 6E; col. 2, lines 1-5) as teaching "a step of removing a projected end portion of said protecting film which [is] projected into said opening and which is produced in said opening forming step." Col. 2, lines 1-5 of *Terui* read as follows:

> side (FIG. 6D). Subsequently, as shown in FIG. 6E, the SiO_2 layer 102 is removed by use of buffer hydrofluoric acid. After that, deep ultraviolet light is irradiated onto the nozzle molding material 105 to make it soluble. Subsequently, the nozzle molding material 105 is removed. The electrode

The cited portion of *Terui* is not understood to teach or suggest the projected end portion removing step of Claim 2. Regarding the SiO_2 layer 102, it is noted that the portion of that layer at the supply port was previously removed as shown in Fig. 6D (see col. 1, lines 62-64 ("After that, from the reverse side of the wafer 101, the SiO_2 layer is removed by use of buffer hydrofluoric acid.")). At col. 2, lines 1-2, the remaining portion of the SiO_2 layer is removed as shown in Fig. 6E. Even if, for the sake of argument, SiO_2 layer 102 be deemed to correspond to a protecting film, as seen in Figs. 6D and 6E SiO_2 layer 102 includes no projected end portion of a protecting film which is projected into an opening and produced in an opening forming step. (Contrast Figs. 6D and 6E with Applicants' Fig. 1D and 1E.)

Further, *Terui*'s nozzle molding material 105 is material inside the nozzle, not a protecting film, and it does not include a projected end portion of a protecting film which is projected into an opening and produced in an opening forming step.

3. Regarding the etching-resistant film removing step (last listed step) of Claim 2, the Office Action (page 5) cites *Sato* (col. 5, lines 37-40) as teaching "removing etch-resistant film after removing projected end portion." Applicants understand that the portion of *Sato* intended to be cited by the Office Action (col. 5, lines 37-40) is as follows:

> After that, the membrane 2 formed by silicon nitride, which serves as the anisotropic etching stop layer, is removed by use of plasma dry etching (FIG. 1E). The conditions are: output, 0.8 kW; pressure, 0.2 Torr; gas flow

The cited portion of *Sato* is not understood to teach or suggest the etching-resistant film removing step of Claim 2. It is noted that membrane 2 is a layer formed on the side of substrate 1 on which the heat generating elements are formed, not on the side on which the supply port is formed (see col. 4, lines 25-30; Figs. 1A-1E). In contrast, the etching-resistant film in Applicants' etching-resistant film removing step is formed on a protecting film that is formed on a surface of a substrate on a side on which a supply port is formed, not on a side on which an energy generating element is disposed. Accordingly, even if for the sake of argument, *Sato*'s membrane 2 be deemed an etching-resistant film, it does not correspond to the etching-resistant film of Applicants' etching-resistant film removing step of Claim 2, since it does not satisfy other limitations of that etching-resistant film recited in Claim 2. Accordingly, it is submitted that *Sato* does not teach or suggest Applicants' etching-resistant film removing step.

Even if *Rajesh et al.* be deemed to teach what is alleged in the Office Action, that document is not understood to remedy the above-described deficiencies of *Terui* and *Sato* with respect to independent Claims 2 and 8.

Since the documents cited in the Office Action, whether taken singly or in combination (even assuming, for the sake of argument, that such combination were permissible), do not teach or suggest all of the elements of independent Claim 2 or independent Claim 8, those claims are believed allowable over those documents.

A review of the other art of record has failed to reveal anything which, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as

references against the independent claims herein. These claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from independent Claim 2 and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request withdrawal of the rejections under 35 U.S.C. § 103, favorable reconsideration and early passage to issue of the present application.

THIRD REQUEST FOR ACKNOWLEDGMENT OF RECEIPT OF CERTIFIED COPY OF PRIORITY DOCUMENT

On the Summary Sheet of the Office Action dated May 11, 2007, box 12)a)1. was checked, but box 12)a) was not checked.

Applicants submitted a certified copy of the priority document to the U. S. Patent and Trademark Office on July 9, 2004.

Applicants respectfully request that the Examiner check box 12)a)1. on the Summary Sheet of the next Office Action to acknowledge that "all" of the certified copies of the priority documents have been received.

Applicants' undersigned attorney may be reached in our Washington office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Douglas W. Pinsky/

Douglas W. Pinsky
Attorney for Applicants
Registration No. 46,994

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200
DWP/klm

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